The Impact of Permafrost Thaw on Caribou Lichen Across the Northwest Territories

Katerina Coveny1, Raquel Alfaro-Sánchez1,2, Sharron Smith3 and Jennifer Baltzer1

1Biology of Department, Wilfrid Laurier University, Waterloo;

*2Department of Agroforestry Technology and Science and Genetics, School of Advanced Agricultural and Forestry Engineering, University of Castilla La Mancha, Albacete, Spain; 3Geological Survey of Canada, Natural Resources Canada, Ottawa,*

The arctic is warming four times faster than the rest of the world and Canada’s woodland caribou are facing the impacts. Caribou rely on caribou lichens, *Cladonia sp*., as an important food source, however, caribou lichens are being affected by climate change through wildfire disturbances, northern shrub encroachment, and potentially, through increased rates of permafrost thaw. As permafrost thaws the active layer thickens, releasing nutrients and warming the soil, leading to an increase in plant productivity, potentially outcompeting established caribou lichen populations. Further, as ice rich permafrost thaws it releases water, increasing soil moisture, leading to lichen waterlogging and death. There is evidence that lichens at lower latitudes may recover from disturbances faster than at higher latitudes. Lichen biomass and richness will be quantified across a latitudinal gradient from 61°N to 69°N, adjacent to the Mackenzie River in the Northwest Territories. Permafrost thaw depths from the past decade will be used as a key predictor of lichen biomass. Territorial and community governments have identified caribou and caribou habitat as a research priority. This study will contribute to our understanding of climate related impacts on caribou lichen, furthering our knowledge of caribou habitat features in an environment of thawing permafrost.